THE
ATMOSPHERIC RESERVOIR
*Examining the Atmosphere and Atmospheric Resource Management*

# Drought persists, expands in North Dakota

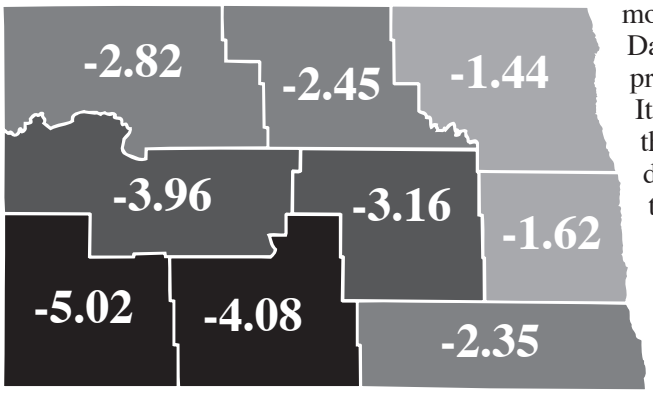
By Darin Langerud

The weather in North Dakota is a topic that is never far from any of its citizen's lips. If you want to strike up a conversation with someone, anyone, simply bring up the topic and see where it goes. Lately, the conversation has no doubt been the summer heat and persistence of the drought. As a matter of fact, the drought, which was largely confined to southern and western parts of our state, expanded to include all of North Dakota by the end of August, though to varying degrees. Drought conditions can be easily seen in the brown prairie grasses and reduced crop yields of much of western North Dakota.

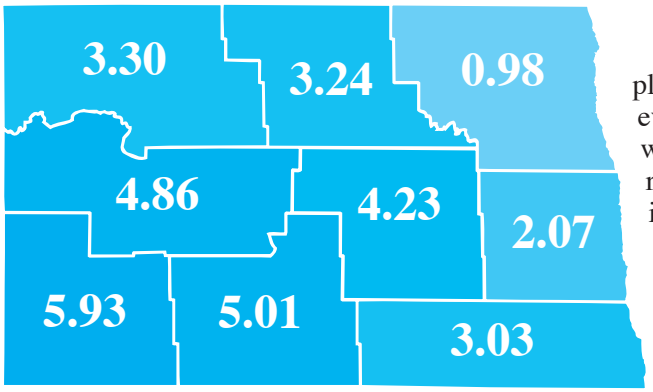
This summer's record-breaking heat and below-average rainfall was brought on by a persistent ridge of high pressure over the western U.S. This meteorological feature acts to divert the weather producing jet stream around its periphery, while warming the areas within its boundaries with cloudless skies and subsiding air. [Subsidence warms the air mass under a high pressure ridge as the sinking air is compressed and heated.] High pressure ridges are a common feature over the western U.S. during the summer, but the one we experienced this year was unusually strong. This led to the jet stream being displaced well north into Canada, reducing the atmosphere's ability to generate thunderstorms, especially during July and August.

North Dakota
Weekly Palmer Drought Index
for the period ending September 6, 2003

-0.5 to -0.9 - Incipient Drought
-1.0 to -1.9 - Mild Drought
-2.0 to -2.9 - Moderate Drought
-3.0 to -3.9 - Severe Drought
-4.0 and below - Extreme Drought




Precipitation Needed (in inches) to End Drought
for the period ending September 6, 2003




There are a few different indices that monitor drought, each with a slightly different blend of data and analysis. All drought monitoring, however, is generally accomplished by comparing soil moisture conditions and rainfall (or snow water equivalent) to long-term averages. The most recent Palmer-Drought Index indicates the severity of the situation as of early September. Negative numbers indicate moisture short areas, whereas positive numbers indicate areas of moisture surplus.

As you can see from the corresponding maps, the drought is most severe in southwest North Dakota with conditions improving to the north and east. It stands to reason, then, that the rainfall required to end the drought follows the same pattern. Looking at these numbers, it is no surprise that much of western North Dakota was under a "red flag warning" for extreme fire danger much of the last two months. Fortunately, no major fires occurred in those areas, unlike the summer of 2002.

A significant rain event took place on September 9-10, however, at the time this column was written the effects of that rainfall had not been taken into account in the drought assessment. We will follow up on this discussion next month once the drought index digests the latest events. With widespread rainfall reports of one to four inches, it appears that we will be able to present a much brighter, or should that be wetter, picture at that time!

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